



Oniscidea: Eco-Heroes Fighting Invisible Pollutants



Vítor Moreira Martins

AE André Soares and Centro de Ciência Viva de Braga, Portugal

"I believe that sharing ideas is essential for our students and all teachers. Studying Oniscidea and creating a habitat for them helps students understand how important it is to preserve biodiversity. Scientific understanding is important when we want to protect something, the lesson reinforces the scientific knowledge about this amazing creature, which can function as a bioremediator."

Learning Objectives

- ✓ Explain what invisible pollutants are and the importance of biodiversity in the school garden/pond, with the absorption of invisible pollutants.
- ✓ Recognize the importance of *Oniscidea* and their interactions in decontaminating soils from invisible pollutants (copper, zinc, lead, arsenic, cadmium). Explain the contributions they make to biodiversity and ecosystems and the critical role they play in the nutrient cycle, soil aeration, and the breakdown of organic matter.
- ✓ Describe the importance of natural shelters for animals, with a focus on *Oniscidea*, and list the abiotic and biotic factors that influence their habitats.
- ✓ We are encouraging creativity and teamwork in the construction of an 'Oniscidea Shelter'.

Suitable for
ages 8+



Introduction

Oniscidea (*known locally as Pill Bugs, Rolly Pollys, or Woodlice*) are vital for biodiversity and ecosystems, decomposition, soil improvement, aeration, nutrients, and recycling. They are important for cleaning up soil contaminated with heavy metals (copper, zinc, lead, arsenic, cadmium) and crystallizing these metals in their midgut.

Through this series of lessons, your students will construct a natural refuge for them, understanding their contribution to absorbing invisible pollutants, especially near the garden. They will also learn how Oniscidea aid in decomposing compost and dead organic matter to benefit other organisms.

This series of lessons actively promotes ecological knowledge and environmental awareness, inspiring to value, protect, regenerate, and fight invisible pollution.

By building a refuge for Oniscidea, students actively engage in preserving biodiversity and fostering a deeper connection with the natural world.

Teacher Preparation

- To be prepared to explain to the students during the activity, research the abiotic and biotic factors of Oniscidea habitats, such as temperature, humidity, soil type, and presence of other animals and plants.
- Familiarise yourself with the contributions of Oniscidea, such as decomposition, soil quality improvement, soil aeration, and nutrient recycling, so you can convey this information clearly and concisely to your students.
- Plan the structure of the lesson, dividing it into moments of introducing concepts, exploring abiotic and biotic factors, presenting the contributions of Oniscidea, constructing the shelters, and concluding the activity.
- Organize the classroom or outdoor space where the shelter construction will take place, ensuring there is enough space and the materials are readily accessible to the students.
- Check you have all the resources needed, such as wooden boards, cardboard, old leaves, and scissors to make your 'Oniscidea Shelter'.
- Prepare a supplementary activity, such as a questionnaire or challenge, to assess the students' understanding of the topics covered at the end of the lesson.





Timings

Lesson 1 will take approximately 90 minutes to complete.

Optional: Followed by 2 or 3 lessons of approximately 30 minutes each, for observations, data collection and further investigation.



Planning Considerations

Disgust or repulsion- some students may feel aversion towards Oniscidea due to their appearance or association with dirty environments. In certain cases, they may be seen as unwanted 'pests', especially as they multiply in large numbers in specific areas, such as gardens.

On the other hand, there may be a belief that Oniscidea are pointless, this can lead students to overlook their ecological importance and underestimate their role in ecosystems!

Oniscidea are often associated with natural environments, and some people may not realize that they can also be present in other locations, such as our homes or even classrooms. When Oniscidea do enter domestic environments, such as kitchens or bathrooms, people may consider them an unwanted nuisance.

REMEMBER:

It is important to address these negative ideas during the activity by providing clear and accurate information about Oniscidea. Explaining their role in decomposing organic matter, maintaining the ecological balance, improving soil health, and their importance in the food chain can help demystify these negative perceptions. This will help broaden students' understanding and appreciation of Oniscidea.

Lesson 1

Visit the link below to view the accompanying lesson presentation and to find more details on how to recreate this lesson.

<http://ecoandresoaes.blogspot.com/2023/05/refugio-dos-bichos-da-conta.html>

Teacher Introduction (10 minutes)

The teacher will provide a brief introduction on the importance of natural shelters for animals in general and then move to introduce Oniscidea in this context. Explain how they can decontaminate soils from invisible pollutants in a variety of ways: eat the pollutants directly, or decompose the organic matter that contains the pollutants. Oniscidea can also help break down pollutants into less toxic compounds.

Discuss the abiotic and biotic factors of Oniscidea habitats and the significance of shelters for this animal using materials available in nature.

Emphasize the importance of biodiversity in the school grounds (with a focus on the Oniscidea) and how shelters can contribute to creating balance between different areas in the school, such as near a pond for the feeding of amphibians, near a compost bin for pollutant absorption, and especially near a green space for decomposing leaves or dead plants.

Students Research (20 minutes)

Divide the students into small groups and provide them with research materials such as books, articles, or internet access to investigate the abiotic and biotic factors of Oniscidea habitats. Ask students to identify and record relevant information: temperature, humidity, soil type, and presence of other animals, and plants.

Construction (40 minutes)

After student research, in a large group setting, the construction of the shelter for the Oniscidea will be planned. The teacher will provide instructions and guidance for the shelter construction, encouraging the use of materials available in nature, such as wooden boards, cardboard, and old tree leaves, among others.

The students will work in groups to build small shelters, taking into consideration the needs of the Oniscidea in the research they completed earlier.

For the construction, students will need to level the ground area where the 'Oniscidea Shelter' will be placed. Then, a layer of dry leaves will be added, followed by a rectangle of cardboard (moistened with water from a spray bottle) with the same area as the wooden board, which will ultimately be placed on top of the other two layers.

LEAVES
Clear a small shady area and cover with old leaves.

PLACE THE CARD
The card should have the same area as the piece of wood.

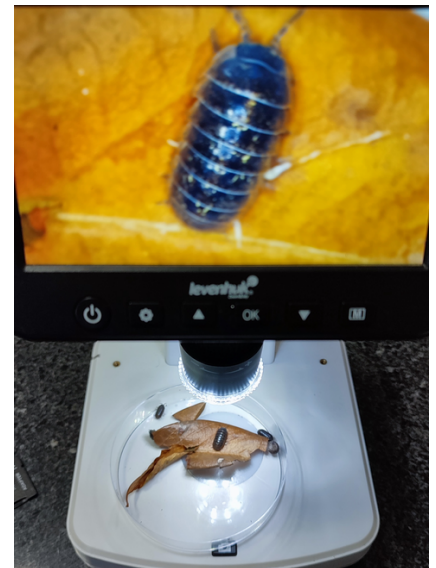
MOISTEN:
Spray water with a spray bottle

PLACE THE WOOD
Place the piece of wood on top of the cardboard

Summary (20 minutes)

The student groups should present their shelters to the class, explaining the choices made for the location of their shelters based on research and how Oniscidea contributes to pollutant absorption, especially when placed near vegetation where plants can help purify the air and soil.

Depending on the age of the students, evaluation, and assessment can be conducted formatively using Mentimeter, Google Forms, and Kahoot quizzes to gather feedback on students' learning progress and active participation in discussions and teamwork in constructing the shelters.



Extension Activities

Record the evolution and occupancy of the Oniscidea Shelters through notes and photographs in follow-up lessons over intervals of weekly periods. Students can carry out statistical analysis across the multiple shelters that have been placed around the school grounds to see if there is any correlation between the number of Oniscidea that are found in each shelter and the variable abiotic factors at each shelter site. Which shelter site is the most successful?

Organize an exhibition of the shelters at school, inviting other students, teachers, and even the students' family members to come and see the work done. During the exhibition, students can explain the importance of the shelters for biodiversity and pollutant absorption, sharing the knowledge they have acquired.

Create shelters in other spaces outside of school in shared public spaces and perhaps ask students to recreate in their home gardens if possible.

Conduct experiments with Oniscidea to further understand the effects of abiotic factors on their behaviour.

For full details of how to do this and to download accompanying worksheets visit the website below.

Concepts/Theoretical (Thinking)	How do Pill bug behave when the abiotic humidity factor varies?	Methodological (Doing)																																	
<p>Concepts/Principles: The influence of humidity on animals</p> <ul style="list-style-type: none"> • T₁ • T₂ 		<p>Conclusion:</p> <p>Discussion of results:</p>																																	
<p>Concepts:</p> <ul style="list-style-type: none"> • T₁ • T₂ <p>Material and procedures:</p> <p>1. Fill 100g of soil in the containers at the end of the experiment</p> <p>2. Add 100g of water to the containers and to separate groups of shelter insects</p> <p>3. Place 100g of soil in the containers</p> <p>4. Record the number of animals that arrive to each shelter in the containers</p>	<p>Number of Pill bug (Oniscidea) observed</p> <table border="1"> <thead> <tr> <th>Humidity</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> <th>9</th> <th>10</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>High</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Humidity	1	2	3	4	5	6	7	8	9	10	Low											High											<p>Conclusion:</p> <p>Discussion of results:</p>
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<http://ecoandresoaes.blogspot.com/2023/06/follow-up-activity-extra.html>